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10/696,280	10/29/2003	Hiroyasu Nishiyama	81940.0060	6493

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HOGAN & HARTSON L.L.P.
1999 AVENUE OF THE STARS
SUITE 1400
LOS ANGELES, CA 90067

EXAMINER	
NGUYEN, PHILLIP H	
ART UNIT	**PAPER NUMBER**
2191	

MAIL DATE	DELIVERY MODE
05/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/696,280	NISHIYAMA, HIROYASU	
	Examiner	Art Unit	
	Phillip H. Nguyen	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *6* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 March 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed on 3/5/2007.

2. Per Applicant's request, Claims 1, 7, 11 and 16 have been amended. Claim 6 has been canceled. Claims 1-5 and 7-21 remain pending and have been considered below.

Drawings

3. The amendment filed on 3/5/2007 overcomes the objection to the drawings of previous action. Therefore, the objection is withdrawn.

Specification

4. The amendment filed on 3/5/2007 overcomes the objection to the specification of previous action. Therefore, the objection is withdrawn.

Claim Rejections - 35 USC § 101

5. The amendment filed on 3/5/2007 overcomes the rejection to claims 1-15 of previous action. Therefore, the rejection is withdrawn.

Claim Rejections - 35 USC § 112

6. The amendment filed on 3/5/2007 overcomes the rejection to claims 6-7 of previous action. Therefore, the rejection is withdrawn.

Response to Arguments

7. Applicant's arguments filed on 3/5/2007 have been fully considered but they are not deemed persuasive.

Applicant asserts on page 11 of the amendment that Desoli does not disclose or suggest, "when the target code is determined to be the native code, the native code emulator processes the native code through hardware emulation". Instead, Desoli discloses. "a native code interceptor module 108 configured to detect native code 118 inserted within emulated code 116 and to execute the native code 118 on hardware 106 without emulation".

Examiner respectfully disagrees with the allegation as argued. Applicant is suggested to see other embodiments in Desoli's approach that clearly teaches the cited limitation. Examiner in his previous office action pointed out locations in the Desoli that relevant the claimed limitations. For further understanding Desoli's emulating system 100 and its functionalities. Examiner points out a few more locations in Desoli that can be considered as relevant to the cited limitations in claims 1, 11 and 16. Desoli discloses "**emulating system 100 is configured to execute software written for a computer system...by emulating the original computer system**..." (see col. 3, line 30-34), "**emulating system 100 is also configured to execute native code that is integrated with the emulated code...emulating system 100 comprises an emulator 102, a dynamic execution layer interface (DELI) 104, and hardware 106. Emulator 102 is linked to DELI 104**..." (see col. 3, line 48-56). Meaning, emulating system 100 is an emulated system of the original computer system for executing native code.

Desoli further discloses "**DELI 104 automatically takes control of an executing program in a manner in which the executing program is unaware that it is not executing directly on computer hardware**" (see col. 4, line 5-7). This DELI 104 links to the Emulator 102 and executes (not directly on computer hardware) native code. There must be hardware emulation involved in order to execute the native code without directly on hardware. Desoli further discloses, "**Emulator 102 includes a native code interceptor module 108 and an emulation module 110. Generally speaking, emulation module 110 emulates the hardware of an emulated system...performs all of the actions that the original hardware would have performed during native execution of the program**" (see col. 4, line 12-19). The emulation module 110 emulates the hardware (hardware 106) of emulated system and performs the execution of native code. Desoli further discloses, "**Native code 118 may also be executed via DELI 104**" (see col. 4, line 64-65). DELI 104 is linked to Emulator 102 and executed native code 118 not directly by computer hardware, but the emulator.

Examiner is entitled to give claim limitations their broadest reasonable interpretation in light of the specification. See MPEP 2111 [R-1] Interpretation of Claims-Broadest Reasonable Interpretation. During patent examination, the pending claims must be 'given the broadest reasonable interpretation consistent with the specification.' Applicant always has the opportunity to amend the claims during the prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 162 USPQ 541, 550-51 (CCPA 1969).

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5, 7-12, and 14-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Desoli (United States Patent No.: US 6,907,519 B2).

As per claim 1:

Desoli discloses:

- a module that calls a native code ("**as is generally known to persons having ordinary skill in the art, interpreters receive code, interpret it by determining the underlying semantics associated with the code, and carry out the semantic actions**" Col 4, line 27-30, **a native code has been called or received in order to perform the execution**);
- a native code emulator that executes the native code through hardware emulation ("**emulation system 100 is also configured to execute native code that is integrated with the emulated code...emulation system 100 comprises an emulator 102**" Col 3, line 48-51; "**Emulator 102 includes a native code interceptor module 108 and an emulation module 110.**

Generally speaking, emulation module 110 emulates the hardware of an emulated system...performs all of the actions that the original hardware would have performed during native execution of the program" see col. 4, line 12-19); and

- a determination module that makes a determination as to whether a target code in a program to be executed is an interpreter code or the native code, wherein, when the target code is determined to be the native code, the native code emulator processes the native code through hardware emulation, and when the target code is determined to be the interpreter code, the native code emulator does not process the interpreter code (see at least FIG. 2 – **if the fetched instruction is NOT native code, the fetched instruction is not executed**).

As per claim 2:

Desoli discloses:

- wherein the native code emulator includes a monitoring module to monitor a memory access instruction by the native code ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have created an exception in the emulated system. By way of example, such an exception could have arisen where there was no permission to access the portion of memory at which the instruction(s) would have been located**" Col 12, line 2-8).

As per claim 3:

Desoli discloses:

- a table ("**Translation Lookaside Buffer**" Col 10, line 30) for memory regions that are managed by the interpreter wherein the table records information as to whether or not each of the memory regions is accessible from the native code ("**save the native context at the time of the exception and storing it away for later...**" **Col 10, line 45-46, the exception occurs when an illegal instruction accesses memory. Native context indicates whether or not each of the memory region is accessible from the native code**).

As per claim 5:

Desoli discloses:

- wherein the native code emulator execute the native code, the monitoring module refers to the table to detect an illegal reference that is made when the memory access instruction is executed ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have been created an exception in the emulated system...This determination is made with reference to the information contained within the system description**" Col 12, line 2-10).

As per claim 7:

Desoli discloses:

- wherein, when the transition between execution of an interpreter code and execution of a native code is performed by a native method call, the determination module does not make the determination until a native method call occurs ("**native code interceptor module 108 (emulator includes a native code interceptor module and an emulation module) is configured to detect native code 118 inserted within emulated code 116 and to execute the native code 118**" Col 4, line 48-50, **a module can contain one or several methods. When the determination process starts, a native method of the native code interceptor module gets called to detect native code. The determination process takes place after it detects native code**).

As per claim 8:

Desoli discloses:

- wherein the native code emulator stores execution state of portion of the native code ("**saving the native context at the time of the exception and storing it away for later when control is returned to it once the exception condition is resolved**" Col 10, line 45-47, **native context indicates the execution state when the exception occurs**).

As per claim 9:

Desoli discloses:

- wherein internal state of the interpreter and the execution state of the portion of the native code are saved when the program is stopped and execution state of the program is saved ("**saving the native context at the time of the exception and storing it away for later when control is returned to it once the exception condition is resolved**" Col 10, line 45-47, **when the exception occurs, the program is stopped**).

As per claim 10:

Desoli discloses:

- wherein the execution state of the program saved is read out to restart execution of the program from a point where the program is stopped ("**native context may be saved and restored later to handle the reentrance**" Col 10, line 49-51).

As per claim 11:

Desoli discloses:

- a module that calls a native code ("**as is generally known to persons having ordinary skill in the art, interpreters receive code, interpret it by determining the underlying semantics associated with the code, and carry out the semantic actions**" Col 4, line 27-30, **a native code has been called or received in order to perform the execution**);

- a monitoring module that monitors a memory access instruction by the native code ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have created an exception in the emulated system. By way of example, such an exception could have arisen where there was no permission to access the portion of memory at which the instruction(s) would have been located**" Col 12, line 2-8; "**Emulator 102 includes a native code interceptor module 108 and an emulation module 110. Generally speaking, emulation module 110 emulates the hardware of an emulated system...performs all of the actions that the original hardware would have performed during native execution of the program**" col. 4, line 12-19); and
- a determination module that makes a determination as to whether a target code in a program to be executed is an interpreter code or the native code, wherein, when the target code is determined to be the native code, the native code emulator processes the native code through hardware emulation, and when the target code is determined to be the interpreter code, the native code emulator does not process the interpreter code (see at least FIG. 2 – **if the fetched instruction is NOT native code, the fetched instruction is not executed**).

As per claim 12:

Desoli discloses:

- a table ("**Translation Lookaside Buffer**" Col 10, line 30) for memory region that are managed by the interpreter wherein the tables records information as to whether or not each of the memory region is accessible from the native code ("**save the native context at the time of the exception and storing it away for later...**" **Col 10, line 45-46, the exception occurs when an illegal instruction accesses memory. Native context indicates whether or not each of the memory region is accessible from the native code**).

As per claim 14:

Desoli discloses:

- a native code emulator that executes the native code through hardware emulation ("**emulation system 100 is also configured to execute native code that is integrated with the emulated code...emulation system 100 comprises an emulator 102**" Col 3, line 48-51).

As per claim 15:

Desoli discloses:

- wherein, when the native code emulator executes the native code, the monitoring module refers to the table to detect an illegal reference that is made when the memory access instruction is executed ("**emulator 102 determines whether the**

instruction fetching action that was conducted in block 400 would have been created an exception in the emulated system...This determination is made with reference to the information contained within the system description" Col 12, line 2-10).

As per claim 16:

Desoli discloses:

- calling a native code ("**as is generally known to persons having ordinary skill in the art, interpreters receive code, interpret it by determining the underlying semantics associated with the code, and carry out the semantic actions**" Col 4, line 27-30, **a native code has been called or received in order to perform the execution**);
- executing the native code by a native code emulator through hardware emulation ("**emulation system 100 is also configured to execute native code that is integrated with the emulated code...emulation system 100 comprises an emulator 102**" Col 3, line 48-51; "**Emulator 102 includes a native code interceptor module 108 and an emulation module 110. Generally speaking, emulation module 110 emulates the hardware of an emulated system... performs all of the actions that the original hardware would have performed during native execution of the program**" col. 4, line 12-19); and
- a determination module that makes a determination as to whether a target code in a program to be executed is an interpreter code or the native code, wherein,

when the target code is determined to be the native code, the native code emulator processes the native code through hardware emulation, and when the target code is determined to be the interpreter code, the native code emulator does not process the interpreter code (see at least FIG. 2 – **if the fetched instruction is NOT native code, the fetched instruction is not executed**)

As per claim 17:

Desoli discloses:

- wherein the native code is not directly executed by hardware ("**the executing program is unaware that it is not executing directly on computer hardware**" Col 4, line 6-8).

As per claim 18:

Desoli discloses:

- the step of monitoring a memory access instruction by the native code ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have created an exception in the emulated system. By way of example, such an exception could have arisen where there was no permission to access the portion of memory at which the instruction(s) would have been located**" Col 12, line 2-8).

As per claim 19:

Desoli discloses:

- creating a table of memory region that are managed by the interpreter; and recording in the table information as to whether or not each of the memory region is accessible from the native code ("**save the native context at the time of the exception and storing it away for later...**" **Col 10, line 45-46, the exception occurs when an illegal instruction accesses memory. Native context indicates whether or not each of the memory region is accessible from the native code**).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 4, 13, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desoli (United States Patent No.: US 6,907,519 B2), in view of Eustace et al. (United States Patent No.: 5,613,063).

As per claims 4, 13 and 20:

Desoli does not explicitly discloses:

- wherein the table records information as to whether or not each of the memory region is readable, writeable or executable from the native code.

However, Eustace discloses an analogous table records information of memory access ("**a table of write tags**" Col 3, line 24).

Therefore, it would have been obvious to one having an ordinary skill in the art to modify Desoli's system to include Eustace' table with a write tag. One of the ordinary skilled in the art would have been motivated to modify Desoli's system **to have a table with a write tag in order to indicate the ensuing valid write operation** (see Eustace Col 4, line 13-14).

As per claim 21:

Desoli discloses:

- the step of, when the native code emulator executes the native code, referring to the table to detect an illegal reference that is made when the memory access instruction is executed ("**emulator 102 determines whether the instruction fetching action that was conducted in block 400 would have been created an exception in the emulated system...This determination is made with reference to the information contained within the system description**" Col 12, line 2-10).

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip H. Nguyen whose telephone number is (571) 270-1070. The examiner can normally be reached on Monday - Thursday 10:00 AM - 3:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Y. Zhen can be reached on (571) 272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PN
5/2/2007

WEI ZHEN
SUPERVISORY PATENT EXAMINER